

Littoral and Parasitic Isopods from Kerala: Families Eurydicidae, Corallanidae and Aegidae—2

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(With two plates and seven text-figures)

[Continued from Vol. 63 (1): 161]

This is the second part of the series and deals with the families Eurydicidae (Cirolanidae), Corallanidae and Aegidae. In all, fourteen species are described. Though the collection contains no new species, it is extremely interesting as it throws light on the progressive evolution of the parasitic habit among the flabelliferan isopods.

Menzies, Barnard and Alverson (1955) dealt at length with the evolutionary and ecological relationship of the flabelliferan families and concluded that the primitive flabelliferan must have been more or less like the present day cirolanids. This primitive stalk got split into two groups, one retained the free living mode of life and developed into the Cirolanidae and the other gave rise to the aegid stalk. The latter in turn evolved into the Aegidae on the one hand and into the Cymothoidae on the other. That this conclusion is substantially correct has been shown by the present study.

The families Cirolanidae (Eurydicidae), Corallanidae, Aegidae and Cymothoidae are closely related and, with regard to parasitic propensity, form a very natural series. At present all the known species of cirolanids are free living but extremely carnivorous. Corallanids are predominantly free living and like the cirolanids carnivorous. But a very small number exhibit parasitic tendency. For instance, *A. rhinoceros* has been recorded as a parasite. During the present study a large number of specimens of *A. normani*, hitherto known only as free living, were collected along with *A. rhinoceros*, from the nostrils of the perch, *Epinepheles chlorostigma*. It is also significant, in this context, that Bal & Joshi (1959) recorded *A. muraenae* as a true parasite.

Aegids are predominantly parasitic and even among the free living members parasitic tendency is evident. During the present study, two species, *Barybrotus indus* and *Alitropus typus*, were observed to show parasitic habit. The former was collected in large numbers from the gill slits and the cloacal aperture of the devil ray, *Mobula diabolus*. Two specimens of *Alitropus typus* were collected from the gill cavity of *Etroplus suratensis*. To get further evidence I introduced a single *Polycanthus cupanus* into an aquarium tank containing a few specimens of *Alitropus typus*. The isopods were seen to get attached to the fish on and off. Both *Barybrotus indus* and *Alitropus typus* are fully equipped for an active free swimming life but exhibit unmistakable signs of becoming parasites. A good many of the present day free living flabelliferans show parasitic tendency and their progressive evolution along this line is, therefore, natural.

Family EURYDICIDAE

Only two genera, *Eurydice* Leach and *Cirolana* Leach are represented in the present collection. In *Eurydice* the basal peduncular segment of the first antenna is expanded and the fifth pleon segment is laterally exposed. In *Cirolana* the first peduncular segment of first antenna is not expanded and the fifth pleon segment is overlapped by the fourth.

Eurydice Leach

Eurydice inermis Hansen (Fig. 1, A-I)

Eurydice inermis Hansen, 1890, p. 366 ; 1906, p. 369, pl. 35, figs. 3a-c.

Remarks. *E. inermis* has so far been recorded only from European waters. The specimens in the present collection so exactly correspond to the description given by Hansen, that there is no doubt about their identity. This species can be distinguished by the shape and armature of the telson. The telson is as long as broad, with the lateral borders serrate at the distal half. The serrations slightly increase in size towards the apex. The distal border of the telson is nearly subtruncate and only one-fourth the total width of the telson and is armed with nine teeth. The extreme lateral teeth and the median tooth are larger than the others.

Body is white with a greyish mottling due to the presence of profusely branched chromatophores.

Length 5.0 mm.

This species occurs in the inshore plankton collections in moderate numbers.

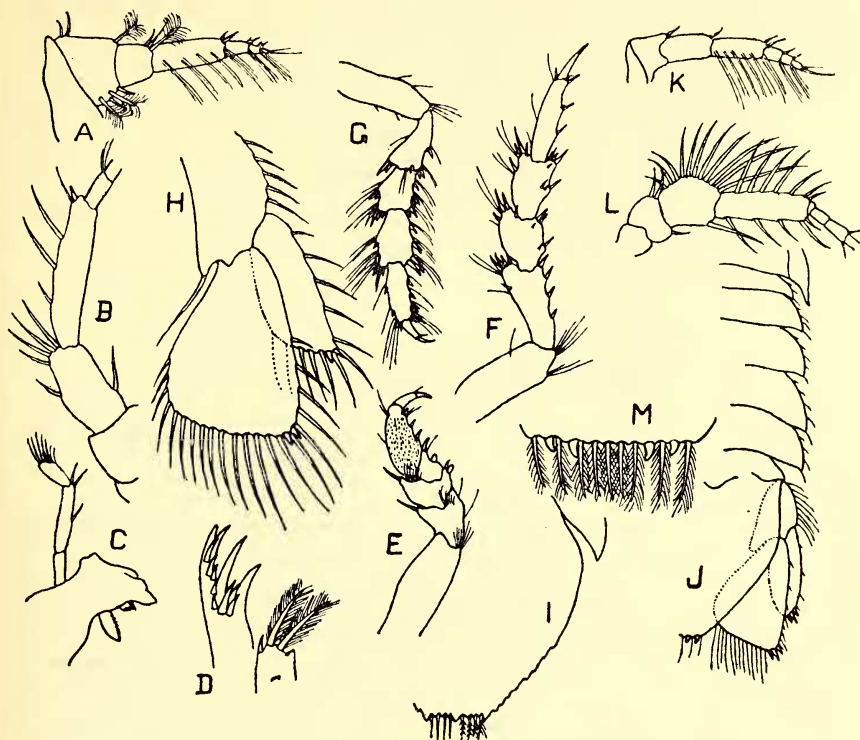


FIG. 1. A-I, *Eurydice inermis* Hansen. A. antennule; B. antenna; C. mandible; D. maxillule; E. first leg; F. sixth leg; G. seventh leg; H. uropod; I. telson. J-M. *Eurydice pulchra* Hansen. J. pleon and telson; K. antennule; L. antenna; M. distal border of telson.

Eurydice pulchra Hansen (Plate I, 1; Fig. 1, J-M)

Eurydice pulchra Hansen, 1890, p. 370, pl. 4, figs. 3a-i; G.O. Sars, 1899, p. 73 pl. 30, f.2; Hansen, 1905, p. 365, pl. 34, f.3 and pl. 35, f.1.

Remarks. Like *E. inermis*, *E. pulchra* has so far been recorded only from European waters. The telsonic apex is very characteristic of this species. Its truncated distal border is one-third the maximum width and is crenulate. There are two pairs of widely separated spines. The dorsal side of the telson has a deep crescentic proximal median groove flanked by shallow grooves. *E. pulchra* closely resembles *E. affinis* Hansen. But in the latter species the distal border of the telson is defined by a pair of conspicuous spines.

Length 4.0 mm.

This species sparingly occurs in the inshore plankton.

Cirolana Leach

The three species described here belong to the group with the posterior peraeon segments and the pleon armed with spines. They can be distinguished by the following key:

- | | |
|---|--------------------|
| 1. Dorsal surface of telson without spines ... | <i>willeyi</i> |
| Dorsal surface of telson with spines ... | 2 |
| 2. Telson with a pair of large submedian basal spines ... | <i>bovina</i> |
| Telson with a pair of submedian rows of spines ... | <i>fluviatilis</i> |

Cirolana willeyi Stebbing (Fig. 2, A-B)

Cirolana willeyi Stebbing, 1904, p. 11, pl. 3 ; Barnard, 1935, p. 312 ; Pillai, 1961 p. 45, fig. 21, 1-2.

Cirolana nigra Chilton, 1924, p. 884, pl. 9, f.3, t. fig. 6.

R e m a r k s. This species can be distinguished by the following characters. Posterior border of peraeon segments two to seven is armed with small spines, fifteen on the fifth, eleven on the sixth and thirteen on the seventh. Pleon segments two to four have five teeth each and the fifth has three, the odd median tooth on each segment is larger than the rest. Dorsal surface of the telson is devoid of spines. Frontal lamina is narrow and long with straight antero-lateral sides, its antero-median part forms an acute angle. Appendix masculina of seventh peraeon segment is a pair of mammiform papillae.

Length 10.0 mm.

This species is very abundant in Kerala, particularly in brackish water localities.

D i s t r i b u t i o n. Ceylon, Chilka Lake and Kerala.

Cirolana fluviatilis Stebbing (Fig. 2, C-D)

Cirolana fluviatilis Stebbing, 1902, p. 52 ; Barnard, 1920, p. 346 ; 1935, p. 310 f. 19 ; 1940, p. 395 ; Pillai, 1961, p. 47, figs. 21, 3-4.

Cirolana pleonastica Chilton, 1924, p. 882, pl. 60, f.2 ; 1926, p. 180, f.2.

Cirolana bicarinata Pillai, 1954, p.6.

R e m a r k s. Like *C. willeyi* this species is very abundant in the estuarine localities in Kerala. It is more slender than *C. willeyi* and is devoid of the black pigmentation which is very characteristic of *C. willeyi*. Peraeon segments four to seven are armed with spines,

the seventh segment has thirteen teeth. Fifth pleon segment has five teeth, the median tooth is slightly larger than the others. The dorsal

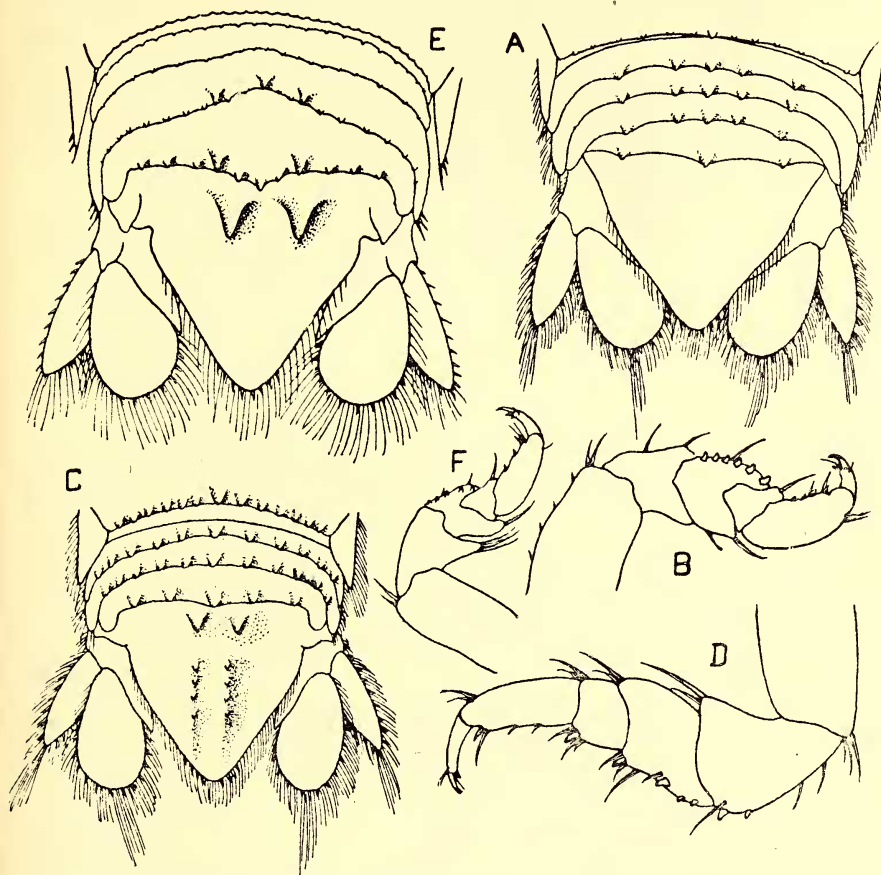


FIG. 2. A-B, *Cirolana willeyi* Stebbing. A. pleon and telson ; B. first leg. C-D, *Cirolana fluviatilis* Stebbing. C. pleon and telson ; D. first leg. E-F, *Cirolana bovina* Barnard. E. pleon and telson ; F. first leg.

side of the telson has two submedian teeth followed by two parallel rows of three to four denticles forming a pair of short ridges.

Length 9.0 mm.

Distribution. South Africa, Siam and India.

***Cirolana bovina* Barnard (Plate I, 2; Fig. 2, E-F)**

Cirolana bovina Barnard, 1940, p. 400, figs. 9 c-d ; Pillai, 1961, p. 47, f.22.

Remarks. In the female the body is roughly oblong, but is longer and nearly parallel sided in the male. Peraeon segments do not carry distinct spines, but the hind margin is feebly crenulate.

Hind border of pleon segments two to five is denticulate, second to fourth are armed with twenty teeth and fifth with eleven teeth, three of the teeth on fourth segment and two on the fifth are larger than the rest and project beyond the border. Dorsal side of the telson has a pair of large, submedian conical teeth to which the specific name alludes. Frontal lamina is pentagonal and slightly longer than broad. Stylet on second male pleopod is slender and apically bent outwards, considerably longer than the endopod.

Length 15.0 mm.

This species is very abundant in the littoral waters of Kerala, and, unlike the other two species, is exclusively marine.

Distribution. South Africa.

Family CORALLANIDAE

Three genera, *Corallana*, *Lanocira* and *Argathona* are represented in the present collection. They can be distinguished by the following key:

- | | | |
|--|-----|------------------|
| 1. First segment of peduncle of first antenna expanded, second segment of maxilliped much longer than broad, seventh segment short | ... | <i>Corallana</i> |
| First segment of peduncle of first antenna not expanded, second segment of maxilliped only slightly longer than broad | ... | 2 |
| 2. First maxilla strongly falcate | ... | <i>Lanocira</i> |
| First maxilla moderately falcate | ... | <i>Argathona</i> |

Corallana Dana

Corallana nodosa Schi. & Mein. (Plate II, 1; Fig. 3)

Corallana nodosa Schi. & Mein., 1879, p. 294, pl. 5, figs. 8-9; Hansen, 1890, p. 389; Stebbing, 1904, p. 14, pl. 1B; Pillai, 1961, p. 49, f.23.

Remarks. This well-known species can be easily recognised by the following characters. In the male the cephalon has a pair of large horns placed at right angles to the surface of the head, just in front of the eyes. Peraeon segments five and six carry two pairs of large posterior submarginal teeth projecting far beyond the hind border of the respective segments, the outer member of each pair is larger than the inner. The seventh peraeon segment has a single

pair of spines. Pleon segments two to four carry a large spine in the middle of each half and the distal border of the segment outer to this spine is crenulate. The apex of the telson forms an independent triangle. Basal segment of the peduncle of the antennule is vertically expanded and over-reaches the cephalic horns. Maxilliped is seven-segmented, second segment is very long and the seventh is very short. First maxilla has a slender curved unguis and a small inner lobe.

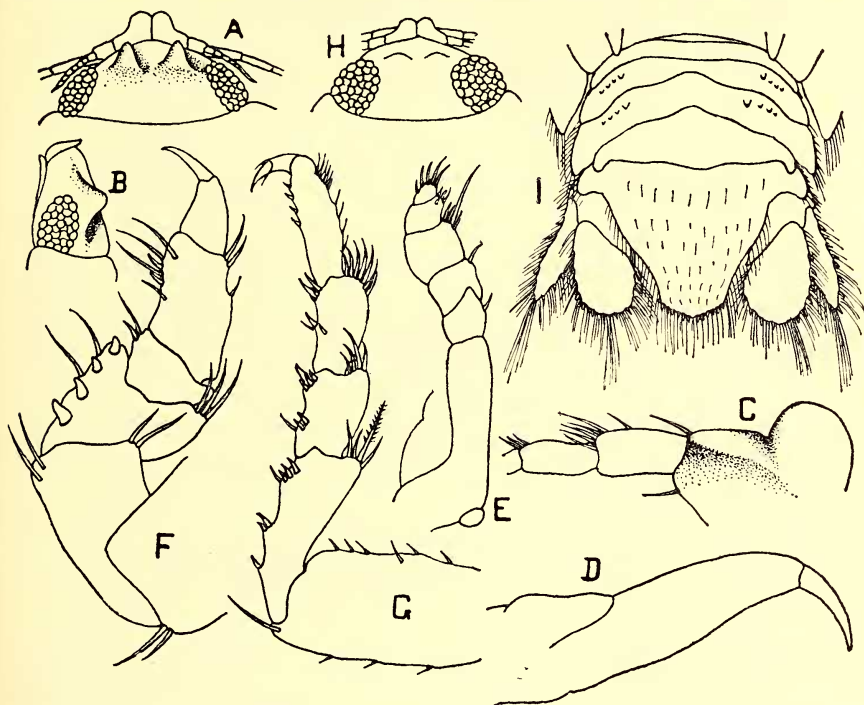


FIG. 3. *Corallana nodosa* Schi. & Mein. A-G. male; A. cephalon, dorsal view; B. same, lateral view; C. antennule; D. maxillule; E. maxilliped; F. first leg; G. seventh leg; H-I. female; H. cephalon, dorsal view; I. pleon and telson.

The female differs from the male in the less setose body, the cephalic horns are very small and the spines on the pereaeon and pleon segments are comparatively very small. The female is uniformly grey due to the presence of numerous highly branched black chromatophores. In the male brick red chromatophores are mixed with the black ones giving it a brownish tint.

Length of male 10.0 mm., of female 8.0 mm.

In the present locality this species has been collected only from brackish water.

Distribution. Philippines and Ceylon.

Lanocira Hansen

The three species contained in the present collection can be distinguished by the following key:

- | | | |
|---|-----|---------------------|
| 1. Cephalon in the male produced into a dorsally curved rostrum | ... | <i>gardineri</i> |
| Cephalon not produced into a rostrum | ... | 2 |
| 2. Telson broadly rounded, coxal plates large and projecting | ... | <i>rotundicauda</i> |
| Telson nearly triangular, coxal plates small and not projecting | ... | <i>zeylanica</i> |

Lanocira gardineri Stebbing (Plate I, 3; Fig. 4, A-H)

Lanocira gardineri Stebbing, 1904, p. 706, pl. 51A; 1905, p. 19; Barnard, 1914, p. 359, pl. 31A.

Remarks. This species can be easily distinguished by the apically curved rostrum and the presence of two low elevations just inner to the eyes on the cephalon of the male. The surface of the cephalon between the eyes is concave. *L. gardineri* shows sexual dimorphism. The rostrum is absent in the female and the first antenna is less feathery than in the male.

Length 7.5 mm.

Moderately common in the littoral waters of Kerala.

Distribution. Maldive Islands, Ceylon and South Africa.

Lanocira rotundicauda Stebbing (Plate I, 4; Fig. 4, I-O)

Lanocira rotundicauda Stebbing, 1905, p. 708; Nierstrasz, 1931, p. 169; Pillai 1954, p. 7.

Remarks. Since its creation, this species has never been redescribed. Stebbing himself suspected that *L. rotundicauda* might be the female of *L. gardineri*. The present collection contains both males and females of *L. gardineri* and the female is very different from *L. rotundicauda*. *L. rotundicauda* can be easily distinguished from *L. gardineri* by the absence of a rostrum, presence of large projecting coxal plates, the comparatively short and roughly semi-circular telson, by its broader frontal lamina and by the absence of an accessory lobe on the mandible. The two species differ also in size, *L. gardineri* reaches a length of 7.5 mm., while the fully adult female of *L. rotundicauda* is only 6.0 mm.

Distribution. Maldive and Laccadive Archipelagos,

Lanocira zeylanica Stebbing (Plate I, 5; Fig. 4, P-R)

Lanocira zeylanica Stebbing, 1905, p. 20, pl. 5B; 1910, p. 219.

Remarks. All the species of *Lanocira* described here occur together and resemble each other to some extent that it is not easy

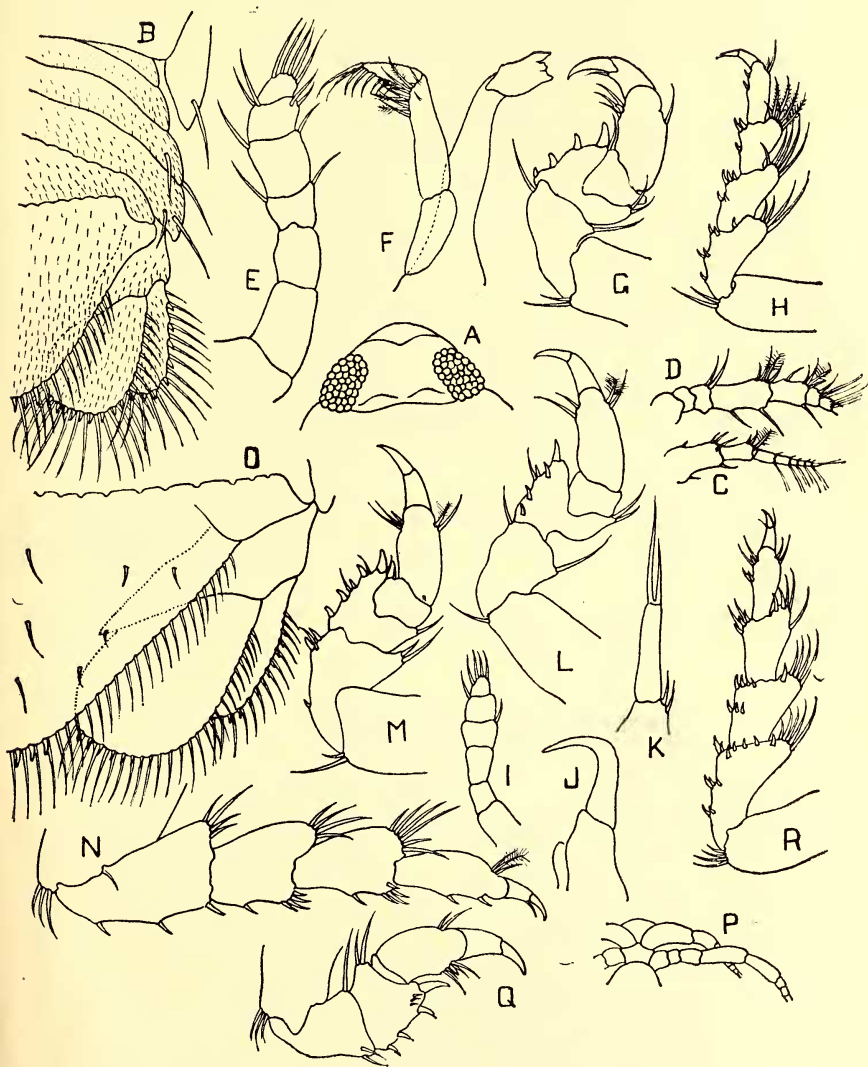


FIG. 4. A-H. *Lanocira gardineri* Stebbing. A. cephalon; B. pleon and telson; C. antennule; D. antenna; E. maxilliped; F. mandible; G. first leg; H. seventh leg; I-O. *Lanocira rotundicauda* Stebbing; I. maxilliped; J. maxillule; K. maxilla; L. first leg; M. second leg; N. seventh leg; O. telson and uropod; P-R. *Lanocira zeylanica* Stebbing; P. frontal lamina; Q. first leg; R. seventh leg.

to distinguish them. *L. gardineri*, as stated earlier, has a rostral prolongation in the male and *L. rotundicauda* has large projecting

coxal plates. *L. zeylanica* differs from both in the presence of a submarginal groove on the cephalon (not shown in the figure) which is, however, difficult to observe, by the short coxal plates and the very short fifth segment of the first peraeopod. There is recognisable difference in the peraeopods of the three species.

Distribution. Ceylon and Red Sea.

Argathona Stebbing

Argathona rhinoceros (Bleeker) (Fig. 5, G-I)

Argathona rhinoceros Stebbing, 1910, p. 100, pl. 9A; Monod, 1933, p. 175
1934, p. 9.

Remarks. The large curved rostrum easily distinguishes this species from all the others. As other distinguishing characters may be mentioned the smooth body and the pentagonal frontal lamina. First maxilla has a small tooth at the base of the unguis and the broad, apically truncate inner lobe carries a small inner spine. The maxilliped is short but stout and six-segmented.

Length 10.0 mm.

A large number of specimens were collected from the nostrils of *Epinepheles chlorostigma* caught on hooks at nearly 50 fathoms off Quilon.

Distribution. Zanzibar, Aldabra Ceylon, Java and Indochina.

Argathona normani Stebbing (Fig. 5, A-E)

Argathona normani Stebbing, 1905, p. 17, pl. 3A; Barnard, 1936, p. 156.

Remarks. This species can be recognised by the extremely hirsute body and the presence of tubercles on the dorsal side. The full complement of tubercles, mentioned by Stebbing, was not observed but the two lateral pairs on the fourth pleon segment, two large submedian ones on the fifth pleon segment and two pairs on the proximal part of the telson are clear. Perhaps, as observed by Barnard, the others are present but indistinguishable.

In the specimens dissected, the maxilliped showed only five segments. The second segment is long and carries a seta in the middle of its inner border. This probably represents the position where two segments might have fused. It should be noted that in *A. rhinoceros* the maxilliped is six-segmented. The first maxilla of *A. normani* has two spines at the base of the unguis,

Length 7.0 mm.

Several specimens were collected along with *A. rhinoceros*.
 Distribution. Ceylon and Bay of Bengal.

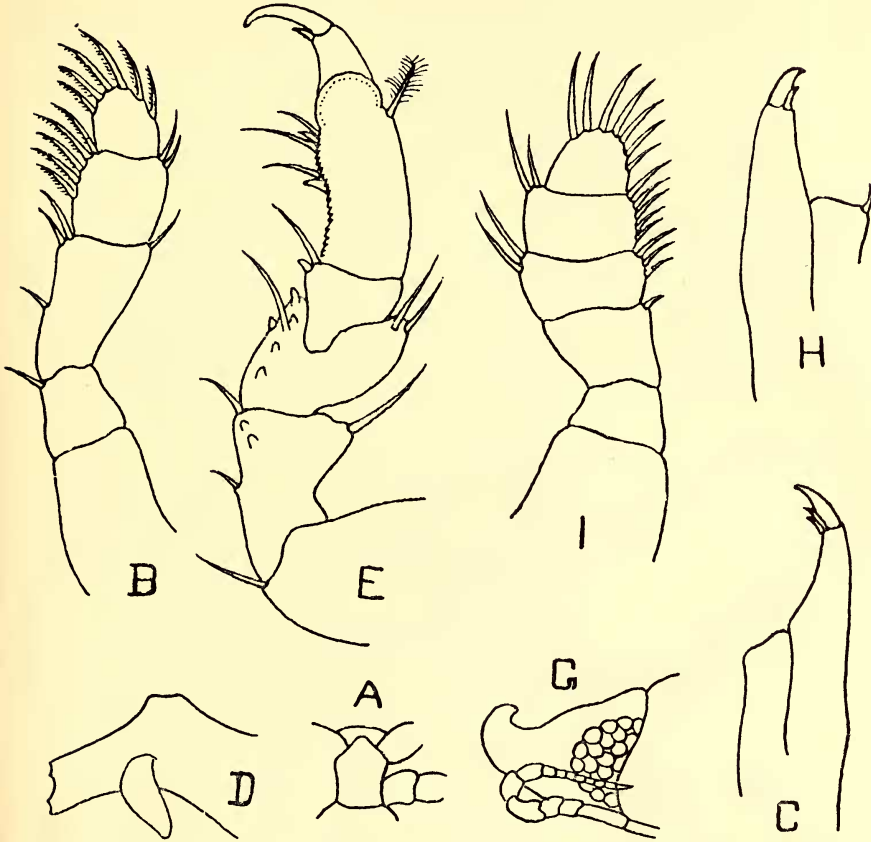


FIG. 5. A-E. *Argathonia normani* Stebbing. A. frontallamina; B. maxilliped; C. maxillule; D. tip of mandible; E. first leg; G-I. *Argathonia rhinoceros* (Bleeker); G. cephalon, lateral view; H. maxillule; I. maxilliped.

Family AEGIDAE

The three genera, *Barybrotos*, *Rocinela* and *Alitropus*, contained in the present collection can be distinguished by the following key:

- 1. Median point of head separates the bases of the first antennae, maxilliped six to seven-segmented ... *Barybrotos*
- Median point of head covering the bases of the first antennae, maxilliped not more than two-segmented ... 2

- | | |
|--|------------------|
| 2. Sixth segment of anterior peraeopods expanded and with strong spines ... | <i>Rocinela</i> |
| Sixth segment of anterior peraeopods not expanded, without strong spines ... | <i>Alitropus</i> |

Genus **Barybrotos** Schi. & Mein.

Barybrotos indus Schi. & Mein. (Plate II, 2; Fig. 6)

Barybrotos indus Schi. & Mein., 1879, p. 281; Monod, 1934, p. 10, pls. 11-17; Barnard, 1936, p. 157.

Remarks. This well-known species has been illustrated in detail by Monod (1934). The more important characters alone are pointed out here. The cephalon is semicircular, with a small antero-medial process projecting between the bases of the first antennae.

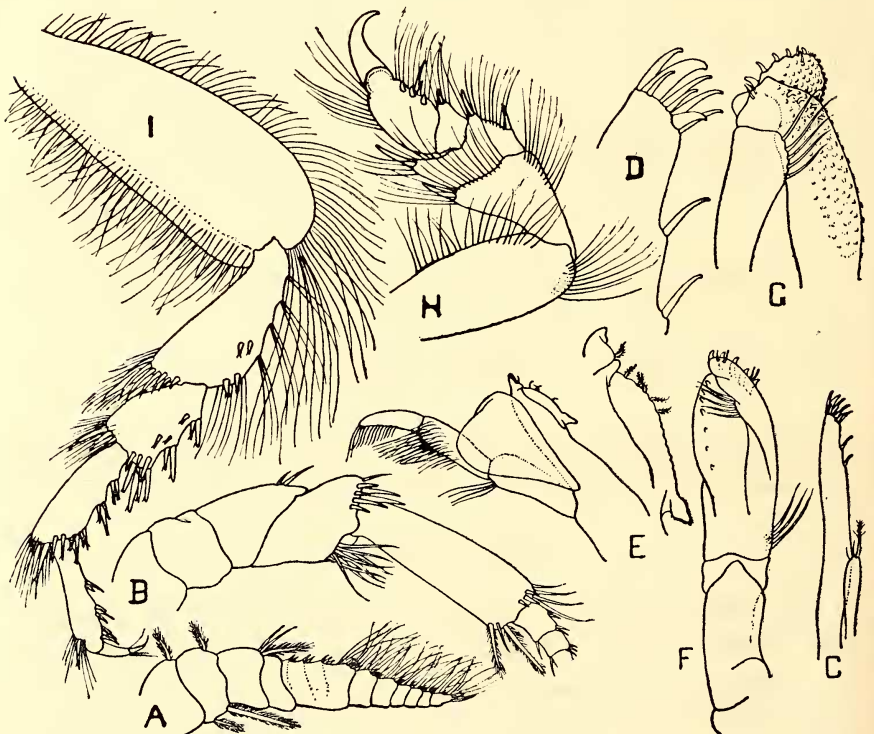


FIG. 6. *Barybrotos indus* Schi. & Mein. A. antennule; B. antenna; C. maxillule; D. same, tip enlarged; E. mandible; F. maxilliped; G. same, inner view; H. first leg; I. seventh leg.

Eyes are large and reniform. Peraeon segments four to six are large, with a prominent lateral groove running inwards. Telson is elongate-

triangular and dorsally arched, its apex, in fully grown specimens, is subtruncate and armed with six strong spines. Basal segment of the peduncle of the first antenna is expanded and visible in the dorsal view of the animal, flagellum is seven-segmented but the basal segment appears to be formed by the fusion of at least four segments. Mouth parts and peraeopods are as illustrated by Monod, but the setae on the second segment of the posterior peraeopods are longer than in Monod's specimens. Frontal lamina is club-shaped. Inner lobe of the first maxilla has a pair of setae at the base of the large seta.

Only two species, *B. indus* Schi. & Mein., and *B. agilis* Schi. & Mein., have hitherto been recorded. According to Stebbing these two are synonymous and the name *indus* has precedence. The genus is hence monotypic.

Length 20.0 mm.

The collection includes nearly sixty specimens from the gills of *Mobula diabolus* caught at Vizhingam.

The body is white but the gut content is visible as a dark stony mass.

Distribution. Bay of Bengal, Java, Gasper Strait, South China, Philippines, Indochina and India.

Genus *Rocinela* Leach

Rocinela orientalis Schi. & Mein. (Plate II, 5; Fig. 7, E-F)

Rocinela orientalis Schi. & Mein., 1879, p. 395, pl. 13, figs. 1-2; Stebbing, 1905, p. 24, pl. 6B; Barnard, 1914, p. 368; Hale, 1925, p. 182, f. 27; Barnard, 1936, p. 160.

Remarks. The single specimen in my collection closely resembles the Ceylon specimens described by Stebbing. The 'fovea' on the head, observed by Hale, is present (not shown in the figure).

To date four species of *Rocinela* have been recorded from this region. As observed by Barnard (1936), *R. latis* Southwell is the young of *Nerocila*, *R. mundana* Lanchester (1902) is synonymous with *R. simplex* Chilton (1926) which is an *Alitropus* and not a *Rocinela* (*vide infra*). Thus the only species known from India is *R. orientalis* Schi. & Mein.

Length 10.9 mm.

Distribution. Philippines, Ceylon, Suez Canal, Zanzibar, Natal, Torres Strait, Morten Bay, Queensland and India.

Genus *Alitropus* M. Edwards

Alitropus typus M. Edwards (Plate II, 3-4; Fig. 7, A-D, G)

Alitropus typus M. Edwards, 1840, p. 263 ; Martens, 1868, p. 59 ; Schi. & Mein 1879, p. 405 ; Weber, 1892, p. 553 ; Stebbing, 1911, p. 181 ; Ingle & Fernando, 1963, p. 106, f.4.

Rocinela mundana Lanchester, 1902, p. 363.

Rocinela orientalis Chilton, 1924, p. 886.

Rocinela simplex Chilton, 1926, p. 182, figs. 4 a-m.

Alitropus dimorphus Pillai, 1954, p. 8.

Male. Body is comparatively slender and elongated, about three times as long as broad. Head is broadly triangular, with the

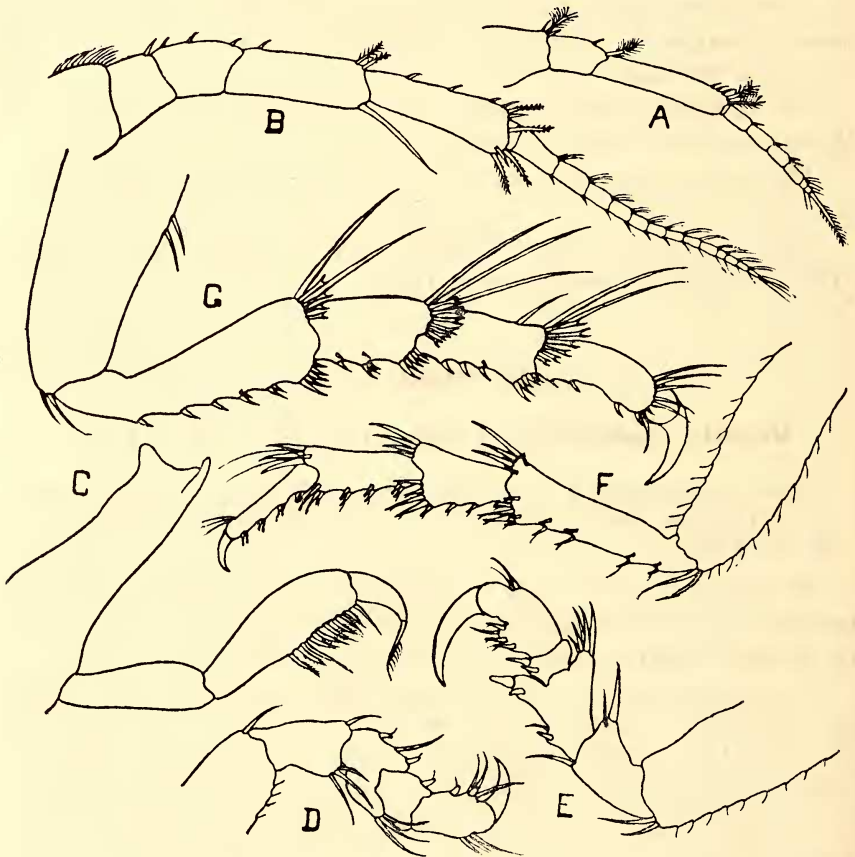


FIG. 7. E-F. *Rocinela orientalis* Schi. & Mein. E. first leg ; F. seventh leg ; A-D and G. *Alitropus typus* M. Edwards. A. antennule ; B. antenna ; C. mandible ; D. first leg ; G. seventh leg.

antero-median part slightly produced. Eyes are large. First pereaon segment is the narrowest, segments one to four successively increase

in length. Antero-lateral corners of first segment are slightly produced forwards and the postero-lateral corners of all the segments are angular. Peraeon segments five to seven are subequal in size, abruptly longer than the fourth segment, sixth segment is slightly longer and broader than all the others. Coxal plates are well developed and produced but not over-reaching the posterior border of the respective segments, each has an outer row of setae. All the five pleon segments are clearly visible, abruptly narrower than the peraeon and slightly immersed in it, lateral parts of segments one to four are drawn out into acute processes, fifth segment is the narrowest. Telson is semicircular, with broadly rounded distal border, in very large specimens the distal border of the telson tends to be broadly triangular, with a subtruncate apex.

First antenna is as long as the peduncle of the second, third peduncular segment is slender and as long as the first two segments combined, flagellum is six-segmented, sixth segment terminates in a long seta. Second antenna over-reaches the second peraeon segment, flagellum is thirteen-segmented.

Second segment of the palp of the mandible is very large, with a comb of stout pectinate setae, third segment is comparatively small, with a single apical seta. First maxilla has a short apical tooth and two long inner spines. Inner lobe of second maxilla has three spines, margin of the outer lobe is serrated. Outer border of maxilliped is hairy, its apex carries three spaced spines. Fifth segment of first peraeopod is slightly immersed in the fourth, sixth segment is cylindrical and not flattened as in *Rocinela*, dactylus is short and falcate. Posterior peraeopods are slender and long, with the lower border of the segments prominently spiny, upper distal angle of segments three to five with a row of stout branched spines and long setae. Peduncle of the second pleopod has six hooks, stylet is shorter than the endopod and carries a small apical spine. Exopod has a series of spots as in *Rocinela simplex* Chilton. Peduncle of the uropod is produced and reaches beyond two-thirds of the length of the endopod, endopod is apically rounded and armed with seven spines, exopod is narrow and long, with seven spines.

Length 13.0 mm., breadth 5.0 mm.

Body is dark grey with profusely branched chromatophores.

Female. Body is comparatively broader than that of the male, twice as long as broad. First peraeon segment is as long as the head, segments five to six are much shorter than in the male, postero-lateral corners of the segments are not acute. Coxal plates are comparatively broad, with rounded apex. Pleon is very short, as

broad as peraeon, segments one to four are equal in length and breadth.

Length 15.0 mm., breadth 7.0 mm.

This is a very common species found in fresh water and also in slightly brackish water. If introduced into an aquarium tank it shows a tendency to cling on to the body of fishes.

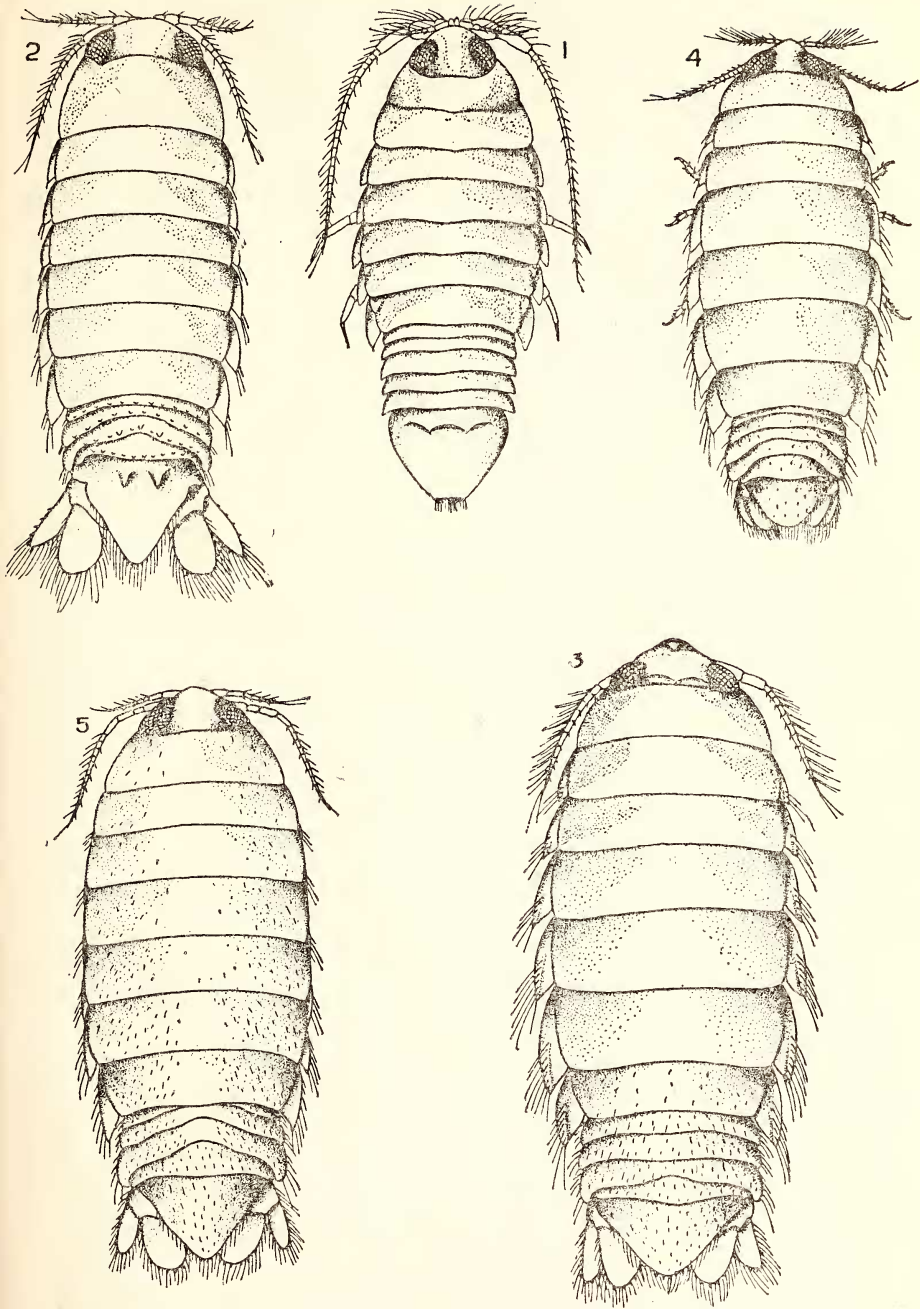
Distribution. Siam, Borneo, Sumatra, India and Ceylon.

Remarks. In the illustrations given by Chilton (1926), figure 4a is described as that of the female and figure 4d as that of an immature male. There appears to be a slight confusion. Figure 4a is that of an adult male and figure 4d that of an immature male or female. Chilton appears to have been unaware of the sexual dimorphism which this species shows. Figure 4k is likely to be that of the second pleopod of the specimen marked 4a and not of 4d.

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Pillai : Isopods



1. *Eurydice pulchra* Hansen ; 2. *Cirolana bovina* Barnard ; 3. *Lanocira gardineri* Stebbing ; 4. *Lanocira rotundicauda* Stebbing ; 5. *Lanocira zeylanica* Stebbing.